Simulating the Effects of Disorder on Goal Setting and Task Performance

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Introducing Disorder

Disorder = Disorganisation = Mess

Problem Statement

- First introduced in the 60's (Merton, 1968; Crozier, 1969; Cohen et al., 1972)
- Over the years various definitions have been given (Warglien and Masuch, 1996; Abrahmson, 2002)
- None of them have reached consensus
- **Problem Statement**
  - Define "disorganisation" (provide a theoretical clarification of the current definitions
    - Characteristics
    - Causes
    - Consequences

Our Target

The Working Definition

"Disorderly accumulation of varied entities in hierarchically ordered complex human structures"

(Abrahamson, 2002)

Disorderly Accumulation	Varied Entities	Hierarchically Ordered	Complex Human Structure
Unplanned and unintended aggregation	People, Relationships, Physical entities (tables, chairs, etc.), problems, solutions, opportunities	Organisations with defined chain of command where each level is responsible for a certain set of tasks	Organisations are complex human systems

Table 1: ***Defining the Terms based on (Abrahamson, 2002; Abrahamson and Freedman, 2006)***

The Model

Disorganisation

- Occurs at every hierarchical level of the organisation
- Happens at every reference point of the organisation i.e. individual, team, departmental, organisational
- Like it or not, this is an unavoidable phenomenon

Goal Setting

- Occurs at every hierarchical level of the organisation
- Happens at every reference point of the organisation i.e. individual, team, departmental, organisational
- Essential to a organisation

Goal Setting Theory

"Hard goals lead to better task performance than vague (less defined) or easy goals if the individual has the efficacy, commitment and is not conflicted with other goals"

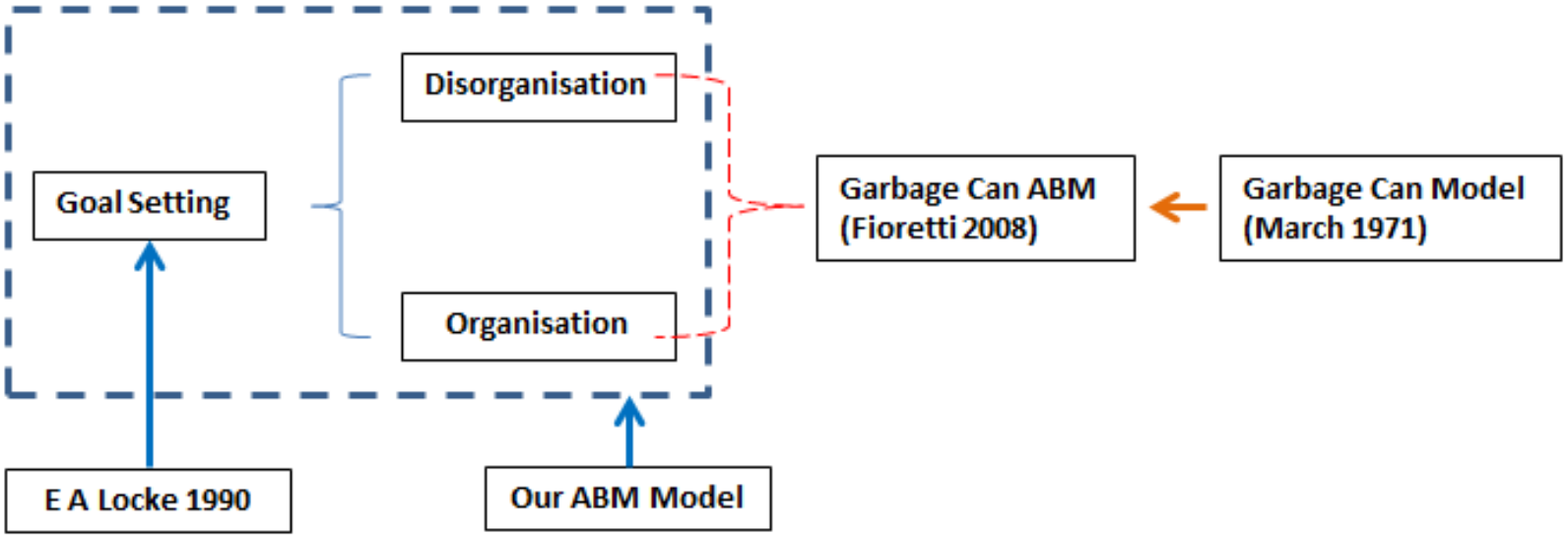
(Locke and Latham, 1990)

1. **Goals that are Hard &/Or Well Defined**
2. **Lead to Better Task Performance**
3. **As opposed to Easy &/Or Vague Goals**

When a Individual has

4. **Efficacy, Commitment and no conflicts**

Theoretical Framework



The Model

- Two scenarios are modelled
  - Disorganisation
  - Organisation

- 4 Types of Agents

Employee (E)		Efficacy (e) , Ability (a), Motivation (m) , level (l)
Problem (P)		Difficulty (d) , level (l)
Solution (S)		Efficiency, level (l)
Opportunity (O)		Level (l)

The Model – Movement

- Disorganised
  - Agents move freely
    - Randomly selected directions

- Organised (Hierarchy)
  - Employees only move to corresponding P,S,O
  - IF

$$E_l \neq P_l \text{ OR } E_l \neq S_l \text{ OR } E_l \neq O_l$$

  - Repulsion Happens

The Model – Decisions

- Decision Making
  - Resolution
    - Happens when all 4 agents are in one patch

$$E(a*m*e) + S_{me}\,(ef) \geq P(d)$$

  - Fail & Redistribution

$$E(a*m*e) + S_{me}\,(ef) < P(d)$$

Increase Fail Count -> $F_c = F_c + 1$

[Random redistribution]

*S_{me} = Most Efficient Solution

The Model – Increments and Reporting

- Resolution Count Increments

$$Rc = Rc + 1$$

- IF HARD Goal -> $2*(E(a*m*e)) < P(d)$

Increase Motivation -> $E(m) = E(m) + 2$

- IF EASY Goal -> $2*(E(a*m*e)) \geq P(d)$

Increase Motivation -> $E(m) = E(m) + 1$

The Model – Reporting

- The number of participants, opportunities, solutions and problems that are in the organization at any point in time
- Total efficiency of solutions
- Total difficulty of problems
- The number of completed tasks
- The number of failed tasks
- Comparison between failed and completed

Difficulties

- Movement Structure
  - Getting all agents into one place
- Motivation Equation
  - 2*(E(a*m*e)) >= P(d) ?
- Introducing new variables

Conclusion & Outlook

- The next step is to complete the simulation
  - Test and optimise
  - Run and Gather data
  - Data analysis

- Upon complete we aim to determine
  - Characteristics of Disorganisation
  - Causes and Consequences

Thank You!

Q & A

References

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- OCKE, E. A. & LATHAM, G. P. 1990. *A theory of goal setting & task performance,* Englewood Cliffs, N.J., Prentice Hall.
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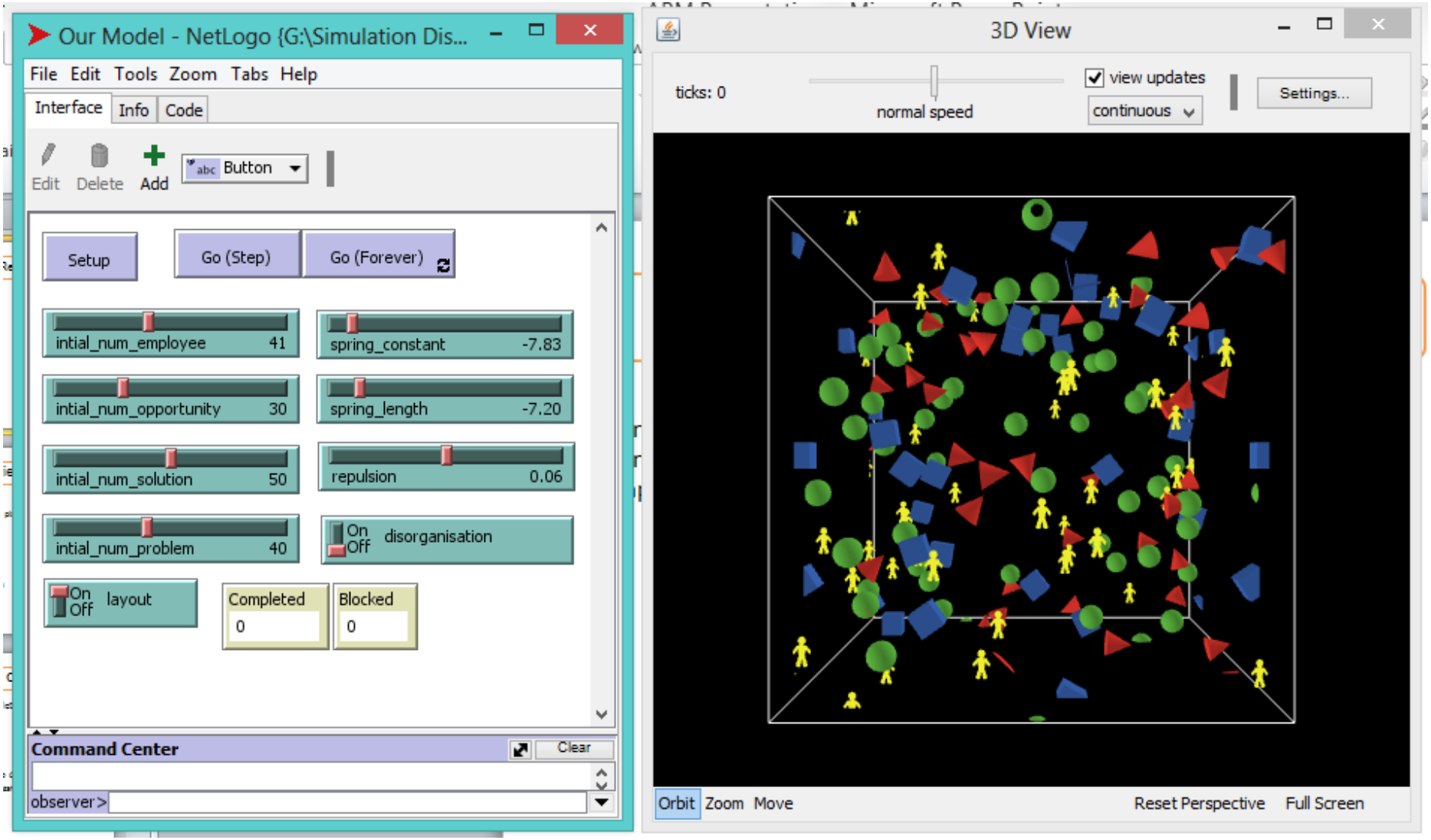
- MERTON, R. K. 1968. Social theory and social structure.
- CROZIER, M. 1969. *The bureaucratic phenomenon*, Transaction Publishers.
- SCOTT, W. R. 1981. Rational, natural, and open systems. Prentice-Hall, Englewood Cliffs.

Screenshot


Our Model - NetLogo {G:\Simulation Dis...
File Edit Tools Zoom Tabs Help
Interface Info Code
Edit Delete Add
Button
Setup
Go (Step)
Go (Forever)
intial_num_employee 41
spring_constant -7.83
intial_num_opportunity 30
spring_length -7.20
intial_num_solution 50
repulsion 0.06
intial_num_problem 40
On Off disorganisation
On Off layout
Completed 0
Blocked 0
Command Center
Clear
observer>
3D View
ticks: 0
normal speed
view updates
continuous
Settings...
Orbit Zoom Move
Reset Perspective
Full Screen

Backup Slides

The Basis

- **PhD Research- Exploring Benefits of Disorganisation Management**
  - Define "disorganisation" (provide a theoretical clarification of the current definitions
    - Characteristics
    - Causes
    - Consequences

Our Target

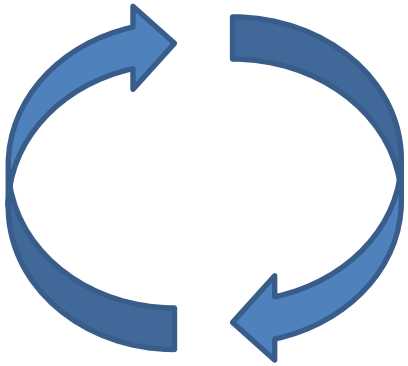
  - Measure disorganisation
    - Can we objectively measure the "disorganisation in an organisation"
    - BDVI Model (Abrahamson, 2002)

  - Are the proposed benefits real ? (are there empirical evidence)
    - March & Olsen (1972), Mauglien (1995), Abrahamson (2002), Freedman (2007)
    - If true, can we optimise the "disorganisation" to achieve favourable outcomes for the organisation

1960 - 1970

- Merton (1968) and Crozier (1969) Theory of Blockage (Why Disorder is needed)

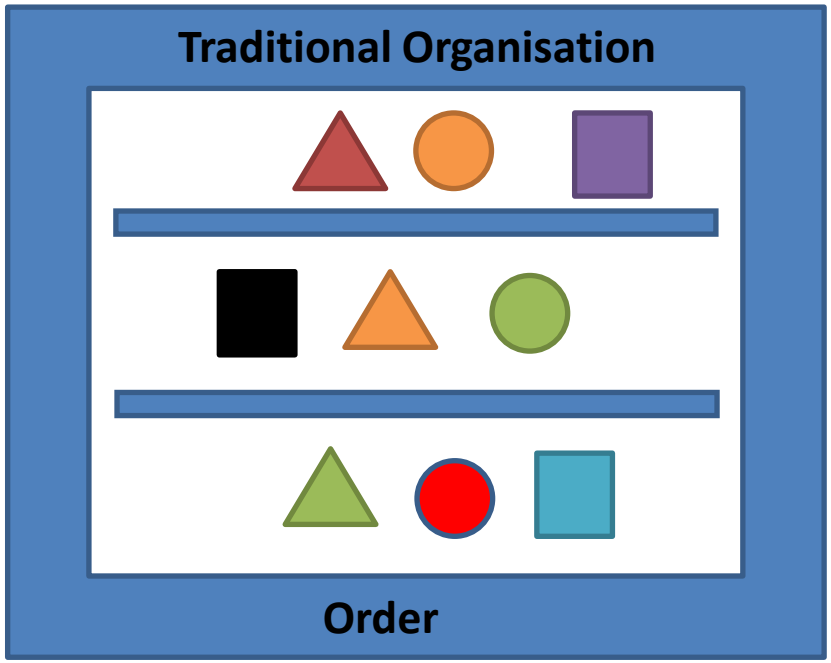
Increasing Order

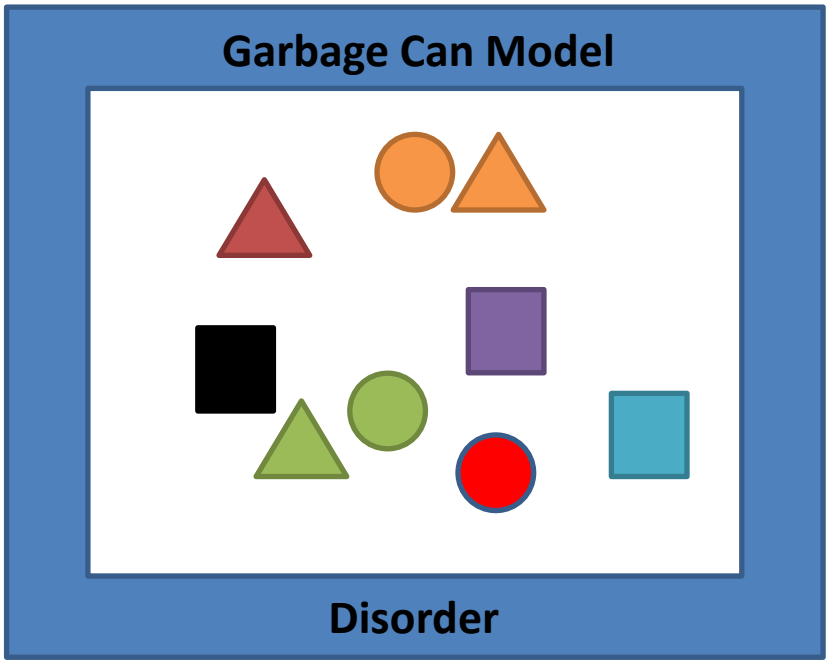


Decreasing Motivation & Increasing Apathy

Timeline of The Concept

- Discussed in 1971 by Cohen,March and Olsen
  - Garbage Can Model
  - Very well established theory





Practical Implications

Amagasaki Rail Crash, Japan 2005

NTSB Found JR West's increased formalisation was a key contributor (Chikudate, 2009)

1980 – Present

- The Logic of Disorganisation (Warglien and Masuch, 1996)
- Theory of Disorder (Abrahamson, 2002)
  - Types of Disorders
    - To Organise Mess
    - Organise Mess
    - Discard Mess
- Benefits of Disorder (Abrhamson and Freedman, 2007)
  - Comparison with order
  - Cost benefit analysis idea
- Garbage Can Buck (Fioretti and Lomim 2008)
  - ABM of the Garbage can model (March and Olsen 1972)

Assumptions

- Agents don’t exit the system
- Engagement with a problem means a goal has already been set

Further Reading

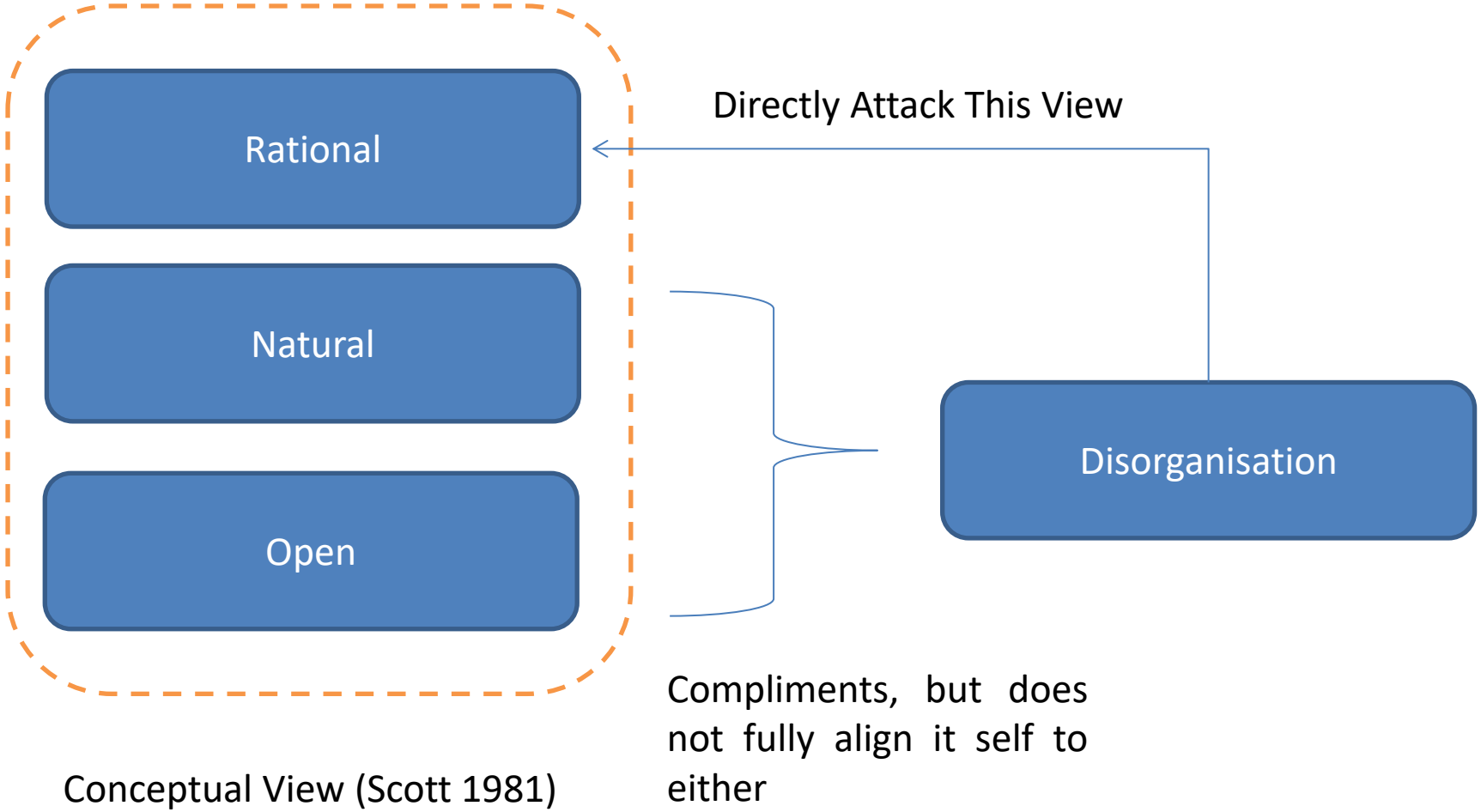
- Some Journals

1. AMJ (Academy of Management Journal)
2. Research In Organisational Behaviour
3. Logic of Organizational Disorder - Walter De Gruyter
4. Journal of Service Industry Management
5. Organisational Research Methods
6. Journal of Artificial Societies and Social Simulation
7. Simulation Modelling Practice and Theory

- Some books

1. A Perfect Mess: The Hidden Benefits of Disorder, LBC
2. The Logic of Organisational Disorder, De Gruyter
3. New Developments in Goal Setting and Task Performance, Cenveo

Theoretical Basis for PhD



Benefits of Disorder

- Open to Innovation (Juxtaposing things)
  - Recombination and Mixture
- Involves more stakeholders in decision making
- Saves money
- Rapid solution development

(Warglien and Masuch, 1996, Abrahamson, 2002; Abrahamson and Freedman, 2007)

Why ABM ?

- Captures emergent phenomena
- Closer to real world interaction as apposed to equation based modelling. (More natural and EBM)
- Can accommodate multiple scales
- Faster and straight forward development capability
- Strategy can be tested using ABM

(Gilbert, 2000; Gilbert, 2008; Bazghandi, 2012, Seccchi, 2013)

ABM References

- BAZGHANDI, A. 2012. Techniques, Advantages and Problems of Agent Based Modeling for Traffic Simulation. *International Journal of Computer Science,* 9**,** 115-119.

- SECCHI, D. Agent-based models for management: An overview of advantages with one example. European Academy of Management Annual Conference, 2013.

- GILBERT, N. 2008. *Agent-based models*, Sage.

Loose Coupling

- Discussed by Glassman, 1973 and Weick 1976
  - Weick brought the concept to management
- Idea in object oriented development
- One class pointing to another class while have minimal knowledge of the other class
- Relationship maintains even though the classes change substantially

Further Development

- Varying problem, solution and opportunity types
  - Stationary
  - Mobile
- Movement Interaction
  - O -> P (opportunity moves to problem)
    - In order of problem difficulty
  - E -> P (employee moves to problem)
    - In order of problem difficulty
  - E,P,O -> S (all three moves towards a solution)
    - In order of solution efficiency
- This process get complicated when types of agents are added to the mix

Further Development

- Introduction of the concept of “training” as acquisition of skills.
  - A set of stationary training agents will be added to the solution space
  - A employee will be sent to “training” if the following condition is met
    1) Every instance when an “problem” is not solved, the employee fail count (E_{fc} would increase)
    2) Then, IF

       $E_{fc} \geq 5$

       Move employee towards training agent.
    3) Every interaction an employee has with a training agents increases E_m (motivation) by a predefined amount or based on a calculation.